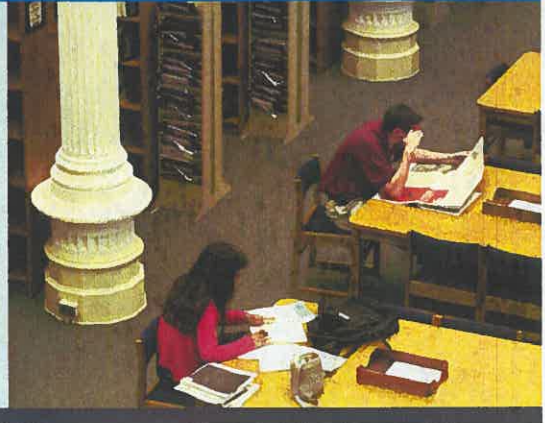


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Fire Investigation Report

Combustion Explosion
60 Grosvenor Street
Buffalo, New York
December 27, 1983
7 Fatalities

Revised: February 17, 1984

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and

National Bureau of Standards/
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ABSTRACT

A combustion explosion in a 70-year old four-story building devastated an east Buffalo neighborhood on December 27, 1983, resulting in the deaths of five fire fighters and two civilians. Approximately 50 to 70 civilians and 26 fire fighters were injured. The explosion resulted when an unauthorized 500 gallon tank of propane was dropped from an industrial lift truck on the third floor, breaking off a valve on the tank. The ignition source was believed to be a wood stove on the first floor of the building. The explosion occurred just shortly after fire department apparatus had reached the scene.

BACKGROUND

The building, built in 1904, was of heavy construction with pilastered brick walls, approximately 12 inch by 12 inch wood posts and beams, and wood plank flooring. The building was originally occupied as the Manhattan Silk Company, then as a jewelry box manufacturing plant, and later it was used as a paper warehouse. The building was abandoned in 1953. The Buffalo Fire Department had no information prior to the December 27 incident that would indicate the building was once again occupied.

A radiator repair business was operating in the property at the time of the explosion. The extent of operations was not initially known, but it appears that radiator repair operations and radiator storage occupied the entire building.

The 60 Grosvenor Street building was protected by an automatic sprinkler system. The operational status of the system at the time of the incident was not determined.

THE INCIDENT

One of three employees working in the Grosvenor building on Tuesday evening, December 27, was moving a 500 gallon ASME Code tank of propane with an industrial lift truck on the third floor. The tank reportedly was to be used for building heat, was secured on the truck with a length of 2 inch by 4 inch wood being used as a block or wedge. The tank was not secured by chains or ropes. The tank fell from the truck which caused a valve to break off allowing liquid propane or propane gas to leak from the tank. The position of the tank when it came to rest and was leaking is not yet known. The opening was 11/16 inch diameter.

The worker attempted to replace the broken valve to plug the tank without success. He then went downstairs to alert the other workers. An attempt was made to shut off the electrical service in the building. The three workers then left the building and departed from the area in a truck. They telephoned the Fire Department from a mobile telephone in the truck.

The Buffalo Fire Department received the alarm at 8:23 p.m. The report to the Fire Department was that a "500 gallon tank bursted (sic)" in the building. Three engine and two ladder companies responded along with a heavy duty rescue and Battalion Chief Harvey Supple. Ladder truck 5 had arrived in front of the building on North Division Avenue, Engines 1 and 32 were parked on North Division and Grosvenor and Battalion Chief Supple was parked at the intersection when the explosion occurred. Reportedly the crews had just arrived on the scene and Battalion Chief Supple was just beginning to get information on the situation when a violent combustion explosion disintegrated the Grosvenor building. The force of the explosion threw the ladder truck across the street, moved both engines, and caused severe blast and missile damage to buildings in the immediate vicinity of the plant.

All five crew members on the ladder truck were killed. Two civilians, who were residents in the neighborhood, were also killed. Nine fire personnel were injured, three critically, and 50 to 70 civilians were injured. The four crew members on both engines were among the injured, along with Battalion Chief Supple. Sixteen additional fire fighters were injured after the explosion, during the fire suppression operations.

A major fire ensued, following the explosion, involving the debris that had been 60 Grosvenor Street and other buildings in and around the one block area. Second and third alarms were ordered immediately, a fourth alarm one minute later at 8:25 p.m., and a fifth alarm was ordered at 8:37 p.m. Additional companies were requested by special call. The fire was brought under control at about 1 a.m. the following morning.

Damage

Damage resulting from the combustion explosion was severe in a 200 to 300 yard radius of the Grosvenor Street plant. Additional damage, mostly broken glass, extended hundreds of yards beyond the severe explosion damage and fire damage areas. A commercial building across Grosvenor Street was destroyed as was a church north of the explosion site. Most other buildings damaged in the incident were wood frame dwellings on all sides of the Grosvenor location. Fourteen buildings were totally destroyed and 84 buildings received damages ranging from minor to severe. The preliminary estimate of damage is \$10 - \$20 million.

DISCUSSION

The cause of the explosion at 60 Grosvenor Street is still under investigation by the Buffalo Fire Department and other agencies. The preliminary findings indicate that gas released from the 500 gallon propane tank resulted in a major accumulation of a flammable gas-air mixture within the structure that was ignited by the wood stove on the first floor.

The existence of a 500 gallon propane tank in a structure was not authorized by the Buffalo Bureau of Fire Prevention. There was no request for a license for propane storage, according to the Fire Prevention chief, and no license was issued. A tank of propane larger than 75 gallons in that class of occupancy is not allowed by the City of Buffalo Flammable Liquid Code or Fire Prevention Code.

NFPA's liquefied petroleum gases standard (NFPA 58-1983)* does not permit ASME Code containers, except those installed on vehicles, (e.g. industrial trucks) or being filled in a proper filling facility (e.g. bulk plant) inside a building for any purpose.

Additional data are necessary to properly analyze the explosion and the time sequence from when the tank was dropped until ignition occurred. The amount of product in the tank was not initially known, nor was detail regarding building openings, ventilation in the structure, and whether the leaking gas was in the liquid or gas phase. It can be determined, however, even with preliminary information that the combustion explosion that occurred could not have happened if NFPA's LP-gas standard had been adhered to.

The condition of the three Fire Department personnel who were in critical condition following the explosion has slightly improved since the incident and all three are expected to recover.

*Standard for the Storage and Handling of Liquefied Petroleum Gases, NFPA 58-1983.



Photo 2: Aerial view of Grosvenor Street shows extent of damage. Ladder 5 is visible beyond roof of dwelling at lower right.

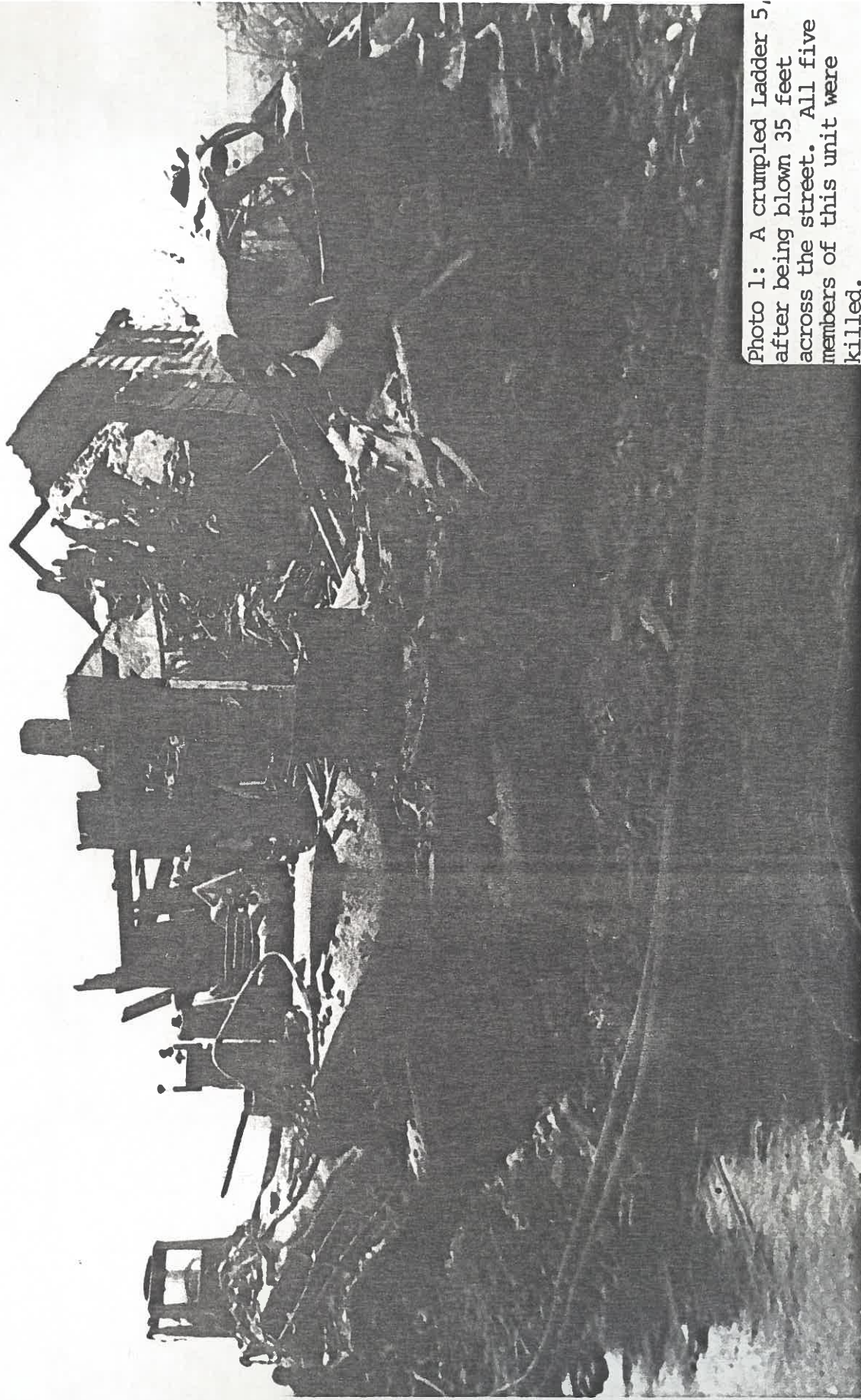


Photo 1: A crumpled Ladder 5, after being blown 35 feet across the street. All five members of this unit were killed.

Credit: The Buffalo News